PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

Annual Review of Base Rates for Fuel Costs for South Carolina Electric & Gas Company	} Docket No. 2019-2-E

Surrebuttal Testimony of Devi Glick

On Behalf of South Carolina Coastal Conservation League and Southern Alliance for Clean Energy

On the Topics of Avoided Cost Calculations and the Costs and Benefits of Solar Net Energy Metering

March 29, 2019

Q. Please state your name and business address for the record.

A. My name is Devi Glick. I work at Synapse Energy Economics, Inc., located at 485 Massachusetts Avenue in Cambridge, Massachusetts.

Q. Have you previously submitted direct testimony in this proceeding?

A. Yes.

Q. What is the purpose of your testimony?

A. The purpose of my surrebuttal testimony is to discuss the rebuttal testimony of (1) James Neely and (2) Joseph Lynch that was filed on behalf of the South Carolina Electric & Gas Company ("SCE&G" or "the Company"), in response to my direct testimony in this docket.

Q. How is your surrebuttal testimony organized?

A. My surrebuttal testimony is organized as follows:

1. Resource planning and capacity need
2. Retirement analysis
3. Avoided generation capacity value
4. NEM Value of DER

1. RESOURCE PLANNING AND CAPACITY NEED

Q. On page 2, Witness Neely defends SCE&G's use of scenario-based modeling, claiming that the results do provide an optimized resource plan.[1] Do you agree that SCE&G has identified an optimal capacity expansion plan?

A. No. SCE&G's modeling approach does not identify an optimal resource plan to meet its system needs at the lowest cost. The Company selected 19 scenarios to test, and then reported out which of its pre-selected scenarios is the lowest-cost. A

[1] Witness Neely Rebuttal Testimony, Docket 2019-2-E. Pages 2-3.

scenario-based analysis and an optimization analysis answer two fundamentally different questions.

Q. Please explain.

A For each of the future years in the IRP, the utility can choose from a number of potential new power plant configurations, retirement opportunities, demand-side management programs, transmission or distribution investments, and other opportunities in the pursuit of reliability at least cost. The number of combinations – that is, the set of choices – is staggering.

The 19 potential solutions the Company selected are likely to be good solutions, in that they are likely to provide relatively low-cost feasible solutions that maintains reliability. However, it is extremely unlikely that any of the 19 potential solutions SCE&G proposed are the needle in the haystack "optimal" solution.

Finding the optimal solution requires optimization software. Such software doesn't pre-judge potential strategies but instead systematically considers *every* potential solution and ultimately discovers the least-cost set of future decisions for generating equipment that maintains system reliability. This is the optimal solution.

Q. How does SCE&G characterize the Company's resource planning tools?

A. SCE&G witness Lynch has previously acknowledged that SCE&G's current planning process needs to be updated, and indeed that the Company is planning to make these changes. At a live hearing in 2018 he stated that the Company is working with vendor ABB to explore portfolio optimizer and capacity-expansion models. He went on to say: "in the near future, we will have more–better models to study all the options."[2] While the Company has expressed its intent to move to

[2] SCE&G expert Joseph Lynch. VOLUME 9 - Live Testimony 11/13/2018. MERITS HEARING 2017-207-E, -305-E, -370-E Page 2468

optimization modeling, its current approach does not yet result in an optimal capacity expansion plan.

Q. On page 3, Witness Neely defends the Company's understanding of its future capacity needs.[3] Does Mr. Neely's explanation alleviate your concerns about SCE&G using the Company's IRP as a basis for its avoided generation capacity value calculation?

A. No. Witness Neely attributes the dramatic changes in load, resource additions, and retirements in the Company's IRPs to the great recession of 2008 and the abandonment of the two nuclear plants. A utility's IRP should reflect the most up-to-date inputs and forecasts available. As I stated in my Direct Testimony, it is reasonable for a utility's resource plan to change from year to year.

If SCE&G's load forecasts and capacity expansion plans outlined in its last several IRPs displayed a predictable and reasonable pattern of change, even taking into account the events raised by Witness Neely, the Company could claim to have a clearer picture of its future capacity. But the forecasts and plans do not display a predictable and reasonable pattern.

This lack of a clear pattern or justification is important because it is unreasonable to base an avoided cost calculation—or lack thereof—on a resource planning process with such a high level of fluctuation and uncertainty.

2. RETIREMENT ANALYSIS

Q. On page 4, Witness Neely responds to your concerns about the Company's retirement analysis and reiterates SCE&G's findings that "it would not be prudent to retire any of its current coal and gas-steam fleet in the near future."[4] Do you agree that SCE&G has conducted adequate retirement analysis to defend this position?

A. No. Witness Neely states that "the need to conduct formal studies of plant retirements is driven primarily by major issues at the plants or a change in

[3] Witness Neely Rebuttal Testimony, Docket 2019-2-E. Page 3.

[4] Witness Neely Rebuttal Testimony, Docket 2019-2-E. Page 4.

regulations such as the Cross-State Air Pollution Rule ("CASPR")."[5] However, major regulations should not be the only driver of a formal retirement analysis. The Company clearly stated in its 2016 and 2017 IRPs that it would "continue to monitor the direction of natural gas prices, environmental regulations, and other factors that might affect the value of these units in serving our customers."[6] There is no mention of any analysis on the impact of changing natural gas prices, coal prices, operational costs, long-term market purchases, or any other factors that might affect the value to customers of continuing to operate coal and gas-fired power plants that are more than 40 years old in the 2019 IRP.

Q. On page 4, Witness Neely states that you "expressed the view, without evidence to support it, that a different evaluation may have produced a more favorable outcome for the retirement scenarios."[7] How do you respond?

A. Despite Mr. Neely's assertion, I did provide specific evidence to support this point. On page 11, lines 9 – 21 of my direct testimony I outline how SCE&G's scenarios were designed in a manner that explicitly disadvantaged the retirement scenarios.

3. AVOIDED GENERATION CAPACITY VALUE

Q. On page 5, Witness Neely reiterates the Company position that "Solar provides no reliable capacity at the time of the winter peaks and as such does not avoid any future capacity. Therefore, the avoided capacity value of solar is zero."[8] Do you agree with this assessment?

A. No. As I outlined on page 16 of my direct testimony, the Company does not definitively establish that its resource additions should be driven by rare winter peaking events. To the extent that the system peaks in the summertime now or in the future, particularly due in part to wintertime-focused energy efficiency or

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[5] Witness Neely Rebuttal Testimony, Docket 2019-2-E. Page 4.

[6] SCE&G 2016 Integrated Resource Plan. Page 35.

[7] Witness Neely Rebuttal Testimony, Docket 2019-2-E. Page 4.

[8] Witness Neely Rebuttal Testimony, Docket 2019-2-E. Page 5.

demand response programs, solar PV does avoid future capacity. While solar does not contribute substantially to meeting the hours of maximum demand during the winter months, solar PV does contribute to meeting the highest loads during summer months.

Additionally, Witness Lynch states on page 7 of his direct testimony that during the 2018 winter peak, 500 MW of solar capacity would have reduced peak by 2.8 percent. This demonstrates that even according to SCE&G's own testimony, solar *does* provide reliable capacity during winter peaks, albeit a relatively small percentage.

4. NEM VALUE OF DER

Q. On page 13, Witness Lynch challenges your claim that the Company did not properly calculate the avoided generation capacity portion of NEM DER, stating that the correct value is zero. How do you respond to this?

A. I reiterate my position that the Company did not properly calculate an avoided generation capacity value for solar QFs. The Company is asking us to accept the value as zero on its face, without providing any actual calculations or modeling to demonstrate its assertion. That error was replicated in the avoided capacity portion of NEM DER.

SCE&G should use a non-zero avoided generation capacity value of NEM DERs.

Q. What value should SCE&G use?

A. Office of Regulatory Staff Witness Horii has calculated an avoided capacity value for the Commission's consideration. Witness Horii utilizes a low solar capacity value factor based on solar nameplate available during winter peak events.

For comparison, I have also calculated a value based on Dominion's execution of the peaker method in the current North Carolina Docket No. E-100, Sub 158, as discussed in my Direct Testimony (see Exhibit No. DG 4). Dominion's methodology utilizes seasonal weightings to incorporate the capacity contribution of solar QFs during annual peak events. This value is $0.00735/kWh for the IRP Planning Horizon (15-year levelized), and $0.00658/kWh for the current period.[9]

The peaker method values the avoided capacity cost based on the cost of a Combustion Turbine (CT) peaking plant that would operate as the marginal resource. This calculation in North Carolina is readily transferable to South Carolina. While there are differences in sales tax, land costs, and several other factors between the two states, these minor adjustments are likely to have a minimal impact on the final avoided cost.

Q. On page 13, Witness Lynch claims that SCE&G has provided a value for each NEM component, but some of those values happen to be zero. Does this meet SCE&G's obligation to continue filling in the NEM value of DER table?

A. No. The Company did separately report values that previously were merged together, such as the value of certain avoided environmental costs and criteria pollutants that were previously accounted for within avoided energy costs. However, the Company has otherwise prioritized adding new cost categories this year, without paying the same amount of attention to filling in the remaining benefit categories. Specifically, the Company again omitted avoided transmission and distribution costs, fuel price hedge, and other environmental costs. Once again, the Company is asking the Commission to accept a value of zero for several categories of NEM DER without providing any additional underlying analysis or calculations.

Q. On page 14, Witness Lynch claims that SCE&G did calculate marginal line losses, not average. Is this accurate?

A. No. As I outlined on page 22 of my direct testimony, the Company's line loss calculations rely on the value of instantaneous losses on the entire system at the time of peak.[10] Marginal losses reflect the value of losses associated with

[9] The avoided generation capacity values were calculated using the peaker method as outlined and executed by Dominion in North Carolina in Docket No. E-100, Sub 158, Exhibit DENC-7. Adjustments were made to levelize the payments over 15 years instead of 10, and value avoided capacity in all years of the IRP.

[10] Line loss methodology provided by SCE&G in CCL and SACE Discovery Response 14.

reducing peak load by a small amount. Lynch's assertion that the Company is calculating marginal line losses is not supported by the methodology outlined by the Company. Marginal losses are approximately twice average losses; therefore SCE&G is undervaluing avoided line losses.

Q. Does this conclude your direct testimony?

A. Yes.

Exhibit DG-4

Table 1 Combustion Turbine Details

	Unit	Value
Capacity	MW	324.2
Discount Rate	%	6.873
PAF		1.07
Capacity Factor	%	93.46

Table 2 Combustion Turbine Costs

	ECC ($k)	Fixed O&M ($k)	CT Fixed Costs ($k)	QF capacity Value ($k)
2019	13,393	2,371	15,764	15,764
2020	13,644	2,415	16,059	16,059
2021	13,899	2,460	16,359	16,359
2022	14,159	2,506	16,665	16,665
2023	14,421	2,556	16,977	16,977
2024	14,687	2,608	17,295	17,295
2025	14,959	2,660	17,619	17,619
2026	15,235	2,713	17,948	17,948
2027	15,517	2,767	18,284	18,284
2028	15,804	2,822	18,626	18,626

Table 3 Summer Capacity Valuation

Weight	50%			
	Cost ($)	on pk hr	MWh	$/MWh
2019	7,882,000	636	192,702	40.90
2020	8,029,393	636	192,702	41.67
2021	8,179,543	636	192,702	42.45
2022	8,332,500	636	192,702	43.24
2023	8,488,500	636	192,702	44.05
2024	8,647,500	636	192,702	44.87
2025	8,809,500	636	192,702	45.72
2026	8,974,000	636	192,702	46.57
2027	9,142,000	636	192,702	47.44
2028	9,313,000	636	192,702	48.33

Table 4 Winter Capacity Valuation

Weight	40%			
	Cost ($)	on pk hr	MWh	$/MWh
2019	6,305,600	504	152,707	41.29
2020	6,423,514	504	152,707	42.06
2021	6,543,634	504	152,707	42.85
2022	6,666,000	504	152,707	43.65
2023	6,790,800	504	152,707	44.47
2024	6,918,000	504	152,707	45.30
2025	7,047,600	504	152,707	46.15
2026	7,179,200	504	152,707	47.01
2027	7,313,600	504	152,707	47.89
2028	7,450,400	504	152,707	48.79

Table 5 Shoulder Capacity Valuation

Weight	10%			
	Cost ($)	on pk hr	MWh	$/MWh
2019	1,576,400	688	208,458	7.56
2020	1,605,879	688	208,458	7.70
2021	1,635,909	688	208,458	7.85
2022	1,666,500	688	208,458	7.99
2023	1,697,700	688	208,458	8.14
2024	1,729,500	688	208,458	8.30
2025	1,761,900	688	208,458	8.45
2026	1,794,800	688	208,458	8.61
2027	1,828,400	688	208,458	8.77
2028	1,862,600	688	208,458	8.94

Table 6 Peak Hours per Season

Number of Peak Hours M-F		Summer	Winter	Shoulder
	Peak hrs/day	6	8	8
	Num Peak Days			
Jan	22		176	
Feb	20		160	
Mar	21			168
Apr	22			176
May	22	132		
Jun	20	120		
Jul	22	132		
Aug	22	132		
Sep	20	120		
Oct	23			184
Nov	20			160
Dec	21		168	
	Total On Peak Hours	636	504	688

Table 7 Levelized Annual Cost

Years	15
Summer	$33.92
Winter	$34.24
Shoulder	$6.27

Table 8 South Carolina PV Output

System Size (kW)		1		
Annual Output (kWh)		1,444.81		
Solar Capacity Payment per year / kW			$/kWh NEM DER	
2019	$	9.51	$	0.00658
2020	$	9.68	$	0.00670
2021	$	9.87	$	0.00683
2022	$	10.05	$	0.00696
2023	$	10.24	$	0.00709
2024	$	10.43	$	0.00722
2025	$	10.62	$	0.00735
2026	$	10.82	$	0.00749
2027	$	11.03	$	0.00763
2028	$	11.23	$	0.00777
2029	$	11.44	$	0.00792
2030	$	11.66	$	0.00807
2031	$	11.87	$	0.00822
2032	$	12.10	$	0.00837
3033	$	12.32	$	0.00853

Table 9 Avoided Generation Capacity Value of NEM DER

Current Period	$	0.00658
IRP Planning Horizon (15-Year Levelized)		$0.00735